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     (FILE 'USPAT' ENTERED AT 14:01:43 ON 16 JUN 94)
L1          1063 S GAMMA(3A)IMAG?
L2             9 S L1 AND COD?(5A)MASK?

=> d l2 1-9

1.  5,099,128, Mar. 24, 1992, High resolution position sensitive detector; Roger Stettner,
250/370.11, 363.06, 363.1, 370.09 [IMAGE AVAILABLE]

2.  4,435,838, Mar. 6, 1984, Method and apparatus for tomographical imaging; Alexander R.
Gourlay, 382/68; 250/363.04, 363.06, 505.1; 378/25 [IMAGE AVAILABLE]

3.  4,240,729, Dec. 23, 1980, Multiple image camera; Howard H. Barney, 354/76; 346/110R; 354/123
[IMAGE AVAILABLE]

4.  4,146,295, Mar. 27, 1979, Holographic device for obtaining a coded image of an object
emitting X-rays or gamma-rays; Jacques Fonrojet, et al., 378/2; 250/363.06; 359/565; 378/36
[IMAGE AVAILABLE]

5.  4,027,315, May 31, 1977, Multiple image camera; Howard Hunter Barney, 354/76; 346/110R;
354/123 [IMAGE AVAILABLE]

6.  3,860,821, Jan. 14, 1975, IMAGING SYSTEM; Harrison H. Barrett, 250/363.01, 363.06, 366, 369,
505.1; 378/2, 145; 976/DIG.429 [IMAGE AVAILABLE]

7.  3,777,161, Dec. 4, 1973, HODOSCOPE READOUT SYSTEM; Lap Yen Lee, 250/361R, 367, 369 [IMAGE
AVAILABLE]

8.  3,748,470, Jul. 24, 1973, IMAGING SYSTEM UTILIZING SPATIAL CODING; Harrison H. Barrett,
378/2; 250/302, 363.01, 363.06, 366; 976/DIG.429 [IMAGE AVAILABLE]

9.  3,671,726, Jun. 20, 1972, ELECTRO-OPTICAL APPARATUS FOR PRECISE ON-LINE MEASUREMENT OF THE
THICKNESS OF MOVING STRIP MATERIAL; James Richard Kerr, 364/563; 250/559, 571; 356/1, 381;
364/469 [IMAGE AVAILABLE]

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US PAT NO:     5,099,128 [IMAGE AVAILABLE]            L4: 1 of 9
DETDESC:
DETD(3)
 FIG. . . . shows in more detail the high resolution camera 1 of the present invention. Key
components of the sensor are a **coded** lead aperture **mask** 5 and a position sensitive high
resolution detector 11.

US PAT NO:     4,435,838 [IMAGE AVAILABLE]            L4: 2 of 9
ABSTRACT:  The . . . concerns a method and apparatus for tomographically imaging different
selected planes of a three-dimensional object by detecting radiation through a **coded** aperture
**mask**, storing an image of the radiation detected over a period of time, and decoding each
selected object plane by a. . .     SUMMARY:    BSUM(3)    This invention relates to a method
and apparatus for tomographical imaging using **coded** aperture **masks**, and is particularly
but not exclusively applicable to medical imaging systems using gamma rays.   SUMMARY:    BSUM(6)
  More recent systems have involved replacing the single pinhole or collimator by a **coded**
aperture **mask** (e.g. a Fresnel Zone plate or a pinhole array). This results in a higher photon
collection efficiency leading to a. . .     SUMMARY:    BSUM(14)    Accordingly, . . .
different selected planes of a three-dimensional object by detecting radiation from the object
after passage of the radiation through a **coded** aperture **mask**, storing an image of the
radiation detected over a period of time, and for each selected object plane decoding the. . .
  SUMMARY:    BSUM(24)    The . . . operation and may be readily implemented in fully hardware
logic circuitry--see G. K. Skinner: "Imaging of Cosmic X-ray sources using **coded** **mask**
telescopes," Proceedings of the British Interplanetary Society Conference, Appleton Laboratory,
Slough, Nov. 15, 1979. This provides both low cost processing. . .     DETDESC:    DETD(2)
Referring to FIG. 1, a coded aperture tomographical imaging system comprises a gamma ray detector
10 and a **coded** aperture **mask** 11 disposed in front of and spaced from the detection
surface 12 of the detector 10. The mask 11 is. . . between the mask 11 and detection surface
12. Shielding is provided in conventional manner to prevent gamma radiation by-passing the
**coded** aperture **mask** 11, and is also provided at the detector 10. In use, the
detector/mask assembly is placed in front of a. . .     DETDESC:    DETD(6)    A highly
advantageous form of **coded** aperture **mask** 11 to use with the above system is a two-fold
mosaicking of a basic n.times.m mask based on an m-sequence. . .     DETDESC:    DETD(29)
While the invention has been shown to be especially useful for use with **coded** aperture
**masks** based on m-sequences, it is of course applicable to any coded aperture tomographical
imaging system for providing a substantial reduction. . . implementation of the fixed decoding
process may not be the most efficient in all cases. The actual construction of the **coded**
aperture **masks** is not described above since this is well known in the art, see for example
U.S. Pat. No. 4,209,780.   CLAIMS:    CLMS(1)    Having . . . different selected planes of
a three-dimensional object by detecting radiation from the object after passage of the radiation
through a **coded** aperture **mask**, storing an image of the radiation detected over a period
of time, and for each selected object plane decoding the. . .     CLAIMS:    CLMS(2)    2. A
method according to claim 1, wherein the **coded** aperture **mask** is based on m-sequences, and
the fixed decoding process uses a Fast Hadamard Transform.   CLAIMS:    CLMS(3)    3. A method
according to claim 2, wherein the **coded** aperture **mask** is twofold mosaicked.   CLAIMS:
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CLMS(6) 6. . . . selected planes of a three-dimensional object by detecting radiation from said object after the passage of the radiation through a **coded** aperture **mask**, wherein an image of the radiation of a selected plane sensed by a detector over a period of time is. . . CLAIMS: CLMS(8) 8. In an apparatus as set forth in claim 7, wherein said **coded** aperture **mask** is twofold mosaicked.

US PAT NO: 4,240,729 [IMAGE AVAILABLE] L4: 3 of 9
DETDESC: DETD(11) The . . . issuing from light-emitting device 58A falls on the sensitive portion of light-sensitive device 60A whenever a transparent portion of a Gray-**coded** **mask** 62 (FIGS. 5 and 7) is disposed therebetween. Whenever an opaque portion of said Gray-**coded** **mask** is disposed between device 58A and device 60A, no light from device 58A will impinge upon device 60A. At the. . . device 60C in the manner discussed above in connection with devices 58A and 60A. Also in the well known manner, Gray-**coded** **mask** 62 remains between set 58 and set 60 throughout its range of travel with lens 11, etc., and the light-emitting. . . DETDESC: DETD(13) Referring . . . shown and described hereinbelow in connection with FIG. 7 being provided to aid set 64 and set 66, along with **mask** 68, in providing unique Gray-**coded** signals corresponding to the vertical positioning of carriage 47 and lens 11. DETDESC: DETD(17) Before . . . invention differs from the X-direction lens carriage position encoder only in that it includes photosensing pairs 64 and 66 and Gray-**coded** **mask** 68, rather than the photosensing pairs 58 and 60 and the Gray-**coded** **mask** 62 shown in FIG. 7. Thus, the Y-direction lens carriage position encoder of the preferred embodiment of the present invention. . . DETDESC: DETD(20) Referring to FIG. 7, it will be seen that, as hereinabove described, Gray-**coded** **mask** 62 is so disposed that its most significant bit (MSB) track 62A is disposed between the most significant bit light-emitting. . . DETDESC: DETD(23) As . . . to mask 68 in the same sense in which the LED's and phototransistors of FIG. 7 are operatively juxtaposed to **mask** 62, whereby a unique Gray-**coded** signal or set of signals is produced at the three output terminals of said substantially identical circuit, one such signal. . .

US PAT NO: 4,146,295 [IMAGE AVAILABLE] L4: 4 of 9
SUMMARY: BSUM(2) The . . . device for carrying out so-called incoherent holography or a device for coding scintillographic or radiographic images with the aid of **coding** screens, or **masks**, for use in astronomical and medical gammagraphic applications. SUMMARY: BSUM(5) The . . . of the various diffracted orders. In order to remedy these difficulties, it has already been proposed to use, as a **coding** screen or **mask**, an eccentric portion of a Fresnel configuration. However, such an incoherent holographic device behaves, from the point of view of. . . DETDESC: DETD(16) The . . . being inscribed in a circular sector. As in the case of point K of FIG. 4a, the centre of the **coding** **mask** synthesised coincides with the apex of the said sector which is also the centre about which the binary mask must rotate to synthesise the said half-tone **coding** **mask**. DETDESC: DETD(17) The **coding** **masks** described above can be used in a tomographic device such as the one illustrated schematically in FIG. 5. DETDESC: DETD(18) The **coding** **mask** C and the receiver R are, in this case, each set in translatory movement within its plane, these translatory movements. . . DETDESC: DETD(19) On . . . object; the cam Ca possesses apertures 2 through which pass shafts A.sub.1 and A.sub.2 constituting the respective supports of the **coding** **mask** C and of the receiver R. In the embodiment shown in FIG. 5, slide guides G1 shown schematically in FIG.. . . DETDESC: DETD(21) It . . . of the planes containing the three principal elements of the system: namely the tomographic plane P, the plane of the **coding** **mask** C, or the plane of the receiver R, the two other elements in each of these situations then being mobile. . .

US PAT NO: 4,027,315 [IMAGE AVAILABLE] L4: 5 of 9 DETDESC: DETD(11) The . . . issuing from light-emitting device 58A falls on the sensitive portion of light-sensitive device 60A whenever a transparent portion of a Gray-**coded** **mask** 62 (FIGS. 5 and 7) is disposed therebetween. Whenever an opaque portion of said Gray-**coded** **mask** is disposed between device 58A and device 60A, no light from device 58A will impinge upon device 60A. At the. . . device 60C in the manner discussed above in connection with devices 58A and 60A. Also in the well known manner, Gray-**coded** **mask** 62 remains between set 58 and set 60 throughout its range of travel with lens 11, etc., and the light-emitting. . . DETDESC: DETD(13) Referring . . . shown and described hereinbelow in connection with FIG. 7 being provided to aid set 64 and set 66, along with **mask** 68, in providing unique Gray-**coded** signals corresponding to the vertical positioning of carriage 47 and lens 11. DETDESC: DETD(17) Before . . . invention differs from the X-direction lens carriage position encoder only in that it includes photosensing pairs 64 and 66 and Gray-**coded** **mask** 68, rather than the photosensing pairs 58 and 60 and the Gray-**coded** **mask** 62 shown in FIG. 7. Thus, the Y-direction lens carriage position encoder of the preferred embodiment of the present invention. . . DETDESC: DETD(20) Referring to FIG. 7, it will be seen that, as hereinabove described, Gray-**coded** **mask** 62 is so disposed that its most significant bit (MSB) track 62A is disposed between the most significant bit light-emitting. . . DETDESC: DETD(23) As . . . to mask 68 in the same sense in which the LED's and phototransistors of FIG. 7 are operatively juxtaposed to **mask** 62, whereby a unique Gray-**coded** signal or set of signals is produced at the three output terminals of said substantially identical circuit, one such signal. . .

US PAT NO: 3,860,821 [IMAGE AVAILABLE] L4: 6 of 9 ABSTRACT: An . . . representing the summation of the shadows from all points of the source of illumination. Spatial modulation is accomplished by a **mask** having a **coded** pattern of transparent and opaque regions linearly scanned in time. The resulting signal has the characteristics of a chirp waveform. . . SUMMARY: BSUM(7) A . . . a transfer function which is conjugate to the scan signal produced from a point source of radiation through the spatially **coded** **mask**, that is, the temporal impulse response function of the filter is the temporal inverse

of the scan signal waveform, so. . . DETDESC: DETD(3) In . . . 4, is utilized instead of the pinhole aperture or collimator array commonly used for photography of high energy particles. The **mask** 30 creates a scrambled or **coded** image at the face of the detector assembly 24 as will be described hereinafter with reference to FIG. 2, and. . .

US PAT NO: 3,777,161 [IMAGE AVAILABLE] L4: 7 of 9 SUMMARY:
BSUM(12) Radiation detection devices have been provided in the art of radiation detection which provide a digital **coded** output. These devices employ **masks** which block portions of the detector in a manner to provide the digital readout. This technique has been used primarily. .

US PAT NO: 3,748,470 [IMAGE AVAILABLE] L4: 8 of 9

ABSTRACT: An . . . representing the summation of the shadows from all points of the source of illumination. Spatial modulation is accomplished by a **mask** having a **coded** pattern of transparent and opaque regions linearly scanned in time. The resulting signal has the characteristics of a chirp waveform. . . SUMMARY: BSUM(7) A . . . a transfer function which is conjugate to the scan signal produced from a point source of radiation through the spatially **coded** **mask**, that is, the temporal impulse response function of the filter is the temporal inverse of the scan signal waveform, so. . . DETDESC: DETD(3) In . . . 4, is utilized instead of the pinhole aperture or collimator array commonly used for photography of high energy particles. The **mask** 30 creates a scrambled or **coded** image at the face of the detector assembly 24 as will be described hereinafter with reference to FIG. 2, and. . .

US PAT NO: 3,671,726 [IMAGE AVAILABLE] L4: 9 of 9 ABSTRACT: On-line . . . corresponding detector units. Each of the detector units is in the form of a plurality of individual photo-sensors arranged in **masked** array to generate a binary-**coded** electrical output signal, the numerical significance of which is indicative of the displacement of the light image from a nominal. . .